

Technion - Israel Institute of Technology



Graduate Studies Program in Information Management Engineering

Updated: Jan 2006

Disclaimer: In any case of disagreement the binding document is the **Hebrew** version of the program. This translation is aimed to ease on prospective foreign students.

1. Program Goals

The development over the last decade of Information Technologies has enabled the development of comprehensive and sophisticated information systems in many diverse areas using ever more integrated technologies.

In parallel, today's users of information systems are demanding increasingly complex applications, utilizing communication networks and including control systems based on Artificial Intelligence, Decision Support Systems, Human Resource Management Systems, Electronic commerce, and more.

The graduate program in Information Management Engineering, offered by the Information Systems division of the Faculty of Industrial Engineering and Management, is designed to provide the knowledge needed by today's and tomorrow's professionals for understanding and developing intelligent and complex information systems with emphasis on the technological-engineering side of information systems.

The program will train researchers and developers to handle the technological challenges presented by existing and future information systems. The program stresses research and focuses on development, implementation and evaluation of methodologies from the areas of systems and software engineering, systems analysis, data bases, artificial intelligence, game theory, computer graphics and vision, communication and distributed systems. These research areas constitute the infrastructure for building the necessary technologies and tools for developing technologically innovative and fundamentally advanced information systems.

Program graduates will integrate successfully in private and business research and development activities, exploiting the knowledge gained within the program's framework. Their areas of expertise will include infrastructure products for information systems or intelligent and complex information systems in different organizations. If they choose to pursue academic research further, graduates will be well equipped to continue to doctoral programs, continuing their MSc research. Alternatively, graduates will be able to delve into new areas emerging from academia or industry.

To reach these goals, students in the program are required to build a knowledge base comprised of fundamental information technologies and synthesis of information whose sources lie in the fields of Software Engineering, Operations Analysis, Artificial Intelligence, Communications, Databases and the Cognitive Sciences. Generally, students' first experience with these fields happens in their undergraduate program. It is, however, during graduate studies that students' knowledge of these areas is deepened. Graduate students must also take courses whose emphasis is on research. Through conducting research students will be exposed to the cutting edge of the various information technologies. These courses, in many cases, form the basis for students' thesis research or project.

Students who successfully complete the graduate program will be awarded an MSc in Information Management Engineering.

2. Admission to the Program

The number of students admitted to the program is limited. Only the most highly suited students will be accepted.

Candidates who are admitted are those who, in the opinion of the admissions committee, have demonstrated a marked potential. Generally, only candidates with the appropriate background are admitted but exceptions have been made for other, less qualified, candidates. These students, when admitted, will be required to take supplementary courses, as decided by the admissions committee.

3. Program Structure

The study program includes courses and a research work: either a thesis or a project.

Courses:

Students, depending on their background, are required to take supplementary courses as detailed in paragraph 4 below, as determined by the admissions committee. In addition, students must take a minimum of eight subjects, for a total of 21 points or more, as detailed below:

a. Mandatory courses. 4 of the above list. It is desirable that the student will use these courses in order to find an advisor and research subject.

096209 -- Information management over the Internet

096210 -- Introduction to Artificial Intelligence

096225 -- Distributed data bases

096226 -- Computation, game theory, and economics

096227 -- Multi agent systems

096229 -- Software and hardware verification

097230 -- Methodologies in information systems engineering

097250 -- Communication networks control

096261 -- Advanced topics in information systems (1), OR,

096262 -- Advanced topics in information systems (2), but **not** both

c. Field Seminar in Information Management Engineering:

098361 – Thesis Seminar 0.5 pts

d. Elective courses, which require the approval of students' supervisor and the approval of the graduate committee, selected from the catalog appearing on the graduate studies web site. The catalog is updated from time to time.

e. Research Project or Final Paper:

A research work (20 points) or a research project (20 points) comprises a central part of students' studies toward the MSc degree. The program encourages execution of a research work. According to the Graduate School's regulations, a final work of only 12 points may be approved in place of the research work or research project. Such work is generally not permitted, since the

degree is research oriented. In special cases when such a work is approved, students will be required to take additional courses, with their supervisors' authorization, for a minimum of 8 points. It is recommended to find an advisor during the **first** year of studying desirably after a semester.

4. Supplementary Studies

The goal of the supplementary studies is to give students a firm foundation for the advanced courses they will be taking. Students will be assigned supplementary courses based on their personal academic background. Each student who is admitted to the program will be required to take supplementary courses if he or she has not completed such courses or their equivalent in their previous studies. Graduate School regulations require that graduates of the three-year program complete a minimum of 20 points of supplementary courses. Completion of the Introduction to Computers and fundamental mathematics courses are generally considered to be the minimum requirement for admission. The supplementary courses will usually be selected from the following list:

Software Engineering

094220	– Software Engineering	3.0 pts
(or 243122	– Introduction to Systems Software	3.0 pts)
094221	– Design and Implementation of Information Systems	3.5 pts
094222	– Specification and Analysis of Information Systems	3.5 pts

Mathematical Methods

094313	– Deterministic Models in Operation Research	3.5 pts
094314	– Stochastic Models in Operation Research	3.5 pts
094412	– Advanced Probability	4.0 pts
234141	– Combinatorics	3.0 pts
(or 234144	– Discrete Mathematics	3.0 pts)

Computer Science

234218	– Data Bases 1	3.0 pts
234247	– Algorithms	3.0 pts
(or 234392	– Algorithms in Graph Theory	3.0 pts)
234292	– Logic for Computer Science 1	3.0 pts
(or 234293	– Logic and Set Theory	4.0 pts)

Information Technologies

236322	– File Systems	3.0 pts
236334	– Introduction to Computer Networks	3.0 pts
236363	– Data Base Systems	3.0 pts
(or Data Base Systems Managements 09420)		

A student's supervisor may require him or her to take additional courses, which may be necessary for the student's research. Similarly, a maximum of one supplementary course may be substituted by a directed reading course. In addition to the courses listed above, there are other courses given by the Faculty of Industrial Engineering and Management as well as other faculties: Computer Science, Electrical Engineering and Mechanical Engineering, which can be taken as supplementary courses, with the approval of students' supervisors. It will be attempted to reduce the load of outstanding students from disciplines which are close to IS.

5. Student Duties

a. Field Seminar

The field seminar meets once a week per semester. Most of the seminars are devoted to guest lectures. On the rest of weeks students present their work to their peers. Every student is required to register for 098361 (which awards 0.5 points) and participate in the seminar for the duration of at least one semester. Students receiving a scholarship are required to take the seminar throughout the scholarship period. Students who do not take the seminar will **not** be eligible to graduate. It is the students' responsibility to monitor the seminar times as published on our web site: <http://iew3.technon.ac.il/ISESeminar/>. A meeting

which is held at the first seminar of the semester is mandatory to **all** students.

b. Teaching Assistance

The faculty may require students to be tutorial advisors for at least one semester. Students who are tutorial advisors will receive a tuition scholarship for the period during which he or she is a TA (in addition to their salary), subject to the Graduate School's terms for scholarship allocation (such as maintaining a specified average grade).

c. Email It is the student's responsibility to check that his or her correct email address appears on the faculty's graduate students in information systems' email addresses list. (Students should contact Mr. Israel Barvo (bravo@ie.technion.ac.il) who maintains the list.) Students' are responsible for keeping updated regarding the announcements sent to the list such as calls for meetings, schedule changes etc.

7. Doctoral Program in Information Management Engineering

The doctoral (DSc) program in Information Management Engineering is intended for MSc graduates in the relevant area. Doctoral study programs are designed for each student individually and include at least 10 points more than the MSc degree program. Students are required to submit a research proposal within 11 months after starting their studies. After submission of the research proposal students will undergo a candidacy examination by an examination committee. The research work must meet all the accepted academic criteria and be approved by the examination committee.

According to the Graduate School's regulations, outstanding students studying for their MSc may be admitted to the direct doctoral track. In exceptional cases, MSc graduates without the requisite background will be admitted to the program as provisionary students subject to taking supplementary courses. Such students will be admitted to the program as regular students provided they fulfill the requirements imposed on them and subject to additional approval by the admissions committee.

8. Faculty and Research Areas

Dr. Avidor Gal

DSc in Information Management Engineering (Technion, 1995)
Data Bases, Distributed And Heterogeneous Information Systems.

Prof. Dov Dori

PhD in Applied Mathematics (Weizmann Institute, 1987)
Systems Modeling, Object-Process Analysis, Software Engineering,
Computer Vision.

Prof. Moshe Tennenholtz

PhD in Applied Mathematics (Weizmann Institute, 1991)
Artificial Intelligence, Game Theory, Electronic Commerce.

Dr. Opher Etzion (Guest Scientist)

PhD in Computer Science (Temple University, 1990)
Intelligent Data Systems, Active Data Bases, Automatic and Adaptive
Programming, Cooperative Information Systems.

Prof. Shay Kutten

DSc in Computer Science (Technion, 1987)
Distributed Algorithms, Communications, Distributed Systems.

Dr. Amir Ronen

PhD in Computer Science (Hebrew University, 2000)
Interplay between Computer Science, Game Theory, and Economics,
Theoretical Computer Science, Electronic Commerce, the Internet.

Dr. Ofer Strichman

PhD in Computer Science (Weizmann Institute, 2001)
Formal Verification of software and hardware, Model-Checking, SAT,
Decision Procedures (algorithms for deciding various first-order-logic
theories).

Dr. Carmel Domshlak

PhD in Computer Science (Ben-Gurion University, 2002)

Artificial Intelligence, Interplay between Computer Science and
Decision Theory, Intelligent Information System

Dr. Sara Cohen

PhD in Computer Science (Hebrew University, 2004)

Databases, Heterogeneous Web information systems